UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
SOLID WASTE AND
EMERGENCY RESPONSE

July 5, 2012

MEMORANDUM

SUBJECT: National Remedy Review Board Recommendations for the Raritan Bay Slag Superfund Site

FROM: Amy R. Legare, Chair
National Remedy Review Board

TO: Walter E. Mugdan, Director
Superfund Division
U.S. EPA Region 2

Purpose

The National Remedy Review Board (the Board) has completed its review of the proposed cleanup action for the Raritan Bay Slag Superfund site, in Old Bridge/Sayreville, New Jersey. This memorandum documents the Board's advisory recommendations.

Context for Board Review

The Administrator established the Board as one of the October 1995 Superfund Administrative Reforms to help control response costs and promote consistent and cost-effective remedy decisions. The Board furthers these goals by providing a cross-regional, management-level, "real time" review of high cost proposed response actions prior to their being issued for public comment. The Board reviews all proposed cleanup actions that exceed its cost-based review criteria.

The Board review is intended to help control remedy costs and to promote both consistent and cost-effective decisions. Consistent with CERCLA and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), in addition to being protective, all remedies are to be cost-effective. The Board considers the nature of the site; risks posed by the site; regional, state, tribal and potentially responsible party (PRP) opinions on proposed actions; the quality and reasonableness of the cost

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estimates; and any other relevant factors or program guidance in making our advisory recommendations. The overall goal of the review is to ensure sound decision making consistent with current law, regulations, and guidance.

Generally, the Board makes the advisory recommendations to the appropriate regional division director. Then, the region will include these recommendations in the administrative record for the site, typically before it issues the proposed cleanup plan for public comment. While the region is expected to give the Board's recommendations substantial weight, other important factors, such as subsequent public comment or technical analyses of response options, may influence the region's final remedy decision. The Board expects the regional division director to respond in writing to its recommendations within a reasonable period of time, noting in particular how the recommendations influenced the proposed cleanup decision, including any effect on the estimated cost of the action. Although the Board's recommendations are to be given substantial weight, the Board does not change the Agency's current delegations or alter the public's role in site decisions; the region has the final decision-making authority.

Overview of the Proposed Action

The Site is located on the shore of Raritan Bay, in the eastern part of Old Bridge Township within the Laurence Harbor section in Middlesex County, New Jersey; a small portion of the western end of the Site, the western jetty at the Cheesequake Creek Inlet, is located in the Borough of Sayreville. The Site is bordered to the north by Raritan Bay and to the east, west and south by residential properties. Approximately 1.5 miles in length, the Site consists of the waterfront area between Margaret's Creek and the area just beyond the western jetty at the Cheesequake Creek Inlet. The portion of the Site in Laurence Harbor is part of Old Bridge Waterfront Park. The park includes walking paths, a playground area, several public beaches and three jetties, not including the two jetties (western jetty and eastern jetty) at the Cheesequake Creek Inlet. The park waterfront is protected by a seawall, which is partially constructed with pieces of waste slag from a secondary lead smelter. The western jetty at the Cheesequake Creek Inlet and the adjoining waterfront area west of the jetty are located in Sayreville. Slag has been placed on top of the western jetty and is observed along the adjoining waterfront. Slag was also observed in the Margaret's Creek area, an undeveloped 47-acre wetland located southeast of the seawall.

EPA has not divided the Site into operable units. The Agency will select one final remedy to address the entire Site. The remedy will eliminate the slag, battery casings, contaminated soil and sediment as sources of contamination for the Site, with long-term surface water and groundwater monitoring. Such monitoring may include biota collection and/or laboratory studies to evaluate the effectiveness of the remedy.

The Region's proposed action involves removal and/or dredging of slag, battery casing/associated wastes, contaminated soils and sediment above the preliminary remediation goals (PRGs) and off-site disposal, with this material primarily located in the western jetty and the seawall, along with some additional material throughout the Margaret's Creek wetlands area. This action also includes monitored natural recovery (MNR) for the wetlands and sediment areas located to the west of the western jetty.

Other components of the remedy include restoration of the wetlands, and monitoring of media such as groundwater and surface water, along with five-year reviews, until remedial action objectives (RAOs) have been achieved.

National Remedy Review Board Advisory Recommendations

The Board reviewed the information package describing this proposal and discussed related issues with Region 2 management and staff (Walter Mugdan, John LaPadula, Angela Carpenter, Tanya Mitchell, Lora Smith, Michael Scorca and Mindy Pensak) by web conference on March 14, 2012. Based on this review and discussion, the Board offers the following comments:

Institutional Controls

The package presented to the Board did not provide detailed information on the types of institutional controls (ICs) that will be needed under CERCLA to ensure protectiveness of human health with regard to all of the affected media, as well as for fishing and clamming. Nonetheless, the Board notes that there are already bay-wide advisories. The Board encourages the Region to work with the State to consider and address any current and potential future exposures that may occur. The Board recommends that the Region's decision documents provide detailed information on use restrictions and areas requiring controls for both the implementation phase of the remedial action and after completion, if need be. Also, it would be helpful for the decision documents to identify the IC implementation measures and specify the entity(ies) responsible for implementing them.

Human Health and Ecological Risk

In the materials presented to the Board, the Region stated that the ecological risk assessment portion of the remedial investigation was a screening level ecological risk assessment, versus a full baseline ecological risk assessment (BERA), with the addition of several focused ecological risk characterizations. In addition, the Region indicated that a substantial portion of the remedy will be driven by ecological risks. While the Board recognizes that guidance (OSWER Directive No.9285.7-25, July 1997, *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments*) does not specifically require that a BERA be performed at every site, the guidance recommends that a BERA generally be performed at sites where the remedy is primarily designed to address ecological risk. The Board recommends that the Region either conduct a BERA in support of the remedy or provide an explanation in the decision documents as to why it did not believe carrying out a full BERA was appropriate for the evaluation of alternatives and selection of the remedy.

It was not clear through the presentation to the Board how each of the PRGs were determined (human health, ecologically based risk or both) and whether the proposed clean-up levels were based upon human health risk reduction, ecological risk reduction, both human and ecological risk reduction, or driven by State regulations. Similarly, it was unclear in the presentation how the individual contaminant risks and associated PRGs fit into the Region's rational for use of a unified PRG approach for both soils and sediments. Given the complexity of issues involved (human and ecological risk, State regulations

and soil-sediment relationships) the Board also recommends that the Region clarify in the decision documents which site-related contaminants and associated risks (human and ecological) are being addressed by the various, specific aspects of the Region's preferred remedy. The Board believes this clarification should help demonstrate how the Region's remedy selection approach ensures protection of human health and the environment, and complies with State applicable or relevant and appropriate requirements (ARARs).

In the presentation to the Board, the Region indicated that, as part of the human health risk assessment, the fish/shellfish arsenic sampling was analyzed for total arsenic and was assumed to be inorganic arsenic. The Board notes that this is a conservative assumption, since the tissue samples were not analyzed for both inorganic and organic arsenic. The Board also notes that at other sites, arsenic speciation in fish tissue has significantly affected the risk conclusions. Since arsenic risk may drive at least a portion of the remedial action and exposure to arsenic via fish consumption appears to be a significant portion of the total arsenic exposure, the Board recommends that the Region explain in its decision documents the assumptions made regarding arsenic speciation within the risk assessment, and how those assumptions affected the evaluation of alternatives and selection of remedial action.

Remedial Action Objectives

The package provided to the Board states that there were two rounds of groundwater sampling, with the second round done to confirm lead results from the first round. The Board is concerned that this sampling approach results is insufficient data on which to base a final groundwater remedial action. The package also states that the RAO for groundwater is to "reduce to acceptable levels the human health risks from the ingestion of groundwater," yet there are no associated PRGs/cleanup levels against which to measure this reduction. The preferred alternative calls for ICs to restrict use of groundwater and long-term monitoring. The Board notes that under the NCP, the remedy selection process under CERCLA is guided by several expectations (see 40 CFR § 300.430(a)(1)(iii)), which include: 1) groundwater should be returned to its beneficial use wherever practicable in a reasonable time frame, and 2) ICs should supplement engineering controls to prevent or limit exposure, but ICs normally "shall not substitute for active response measures" (i.e., ICs are not to be used as the sole remedy unless active response measures are determined to be impracticable). Furthermore, the Agency's long-standing policy (OSWER Directive No. 9355.3-01, October 1988, *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERLCA,* Chapter 4) is that monitoring by itself is not a CERCLA remedial action; the Board is concerned that the information submitted to the Board suggests that monitoring to evaluate effectiveness of the source control remedy may be intended to constitute a final groundwater response action for this site. As such, the Board recommends that the decision documents more clearly explain the role of monitoring in the Region's preferred approach and provide a clear, measurable RAO and associated cleanup level. The Board also suggests that, should one be needed, the Region consider issuing a separate future final groundwater remedial action decision document.

The package provided to the Board states: "Adult anglers and children consuming self-caught fish and hard clam from the Site have cancer risks or noncancer health hazards exceeding EPA's target threshold due to arsenic." In light of this statement, the Board recommends that the Region establish a specific

RAO for this exposure route and develop measurable cleanup levels (concentration limits) for arsenic in specific fish and clams so it is clear when the RAO will be achieved.

Remedy Performance

Based on the package presented to the Board, Alternative 5 would include a sediment cap in Area 8, but it is unclear if the intended purpose of the proposed cap would be as an "active" cap for sequestering lead (such as a reactive core mat design containing apatite) or as an inert sand cap for physical isolation purposes. In light of the CERCLA and NCP preference for remedial actions that utilize treatment technologies to the maximum extent practicable, the Board recommends that the Region explain in its decision documents why it did not further consider a sediment cap (either active or inert). In addition, the Board notes that there are a limited number of *in-situ* treatment technologies (such as soil amendment, solidification/stabilization or mechanical size separation) that could be considered for lead-contaminated soil/sediment in the non-jetty areas of the Site. The Board recommends that the Region better explain in its decision documents why these technologies are not practicable to the maximum extent at this site.

Based on the package provided to the Board, an MNR approach is included as a component of the remedial alternatives. For example, the preferred alternative, as presented in the package, appears to rely on MNR for the wetlands area (including possibly some portions that may be wetland/hydric soil areas). The Board recommends that the Region more clearly explain its proposed use of MNR for the wetland area (e.g., in the hatched area of Figure 38 in the package) and include lines of evidence in the administrative record that support its use. The Board also recommends that the decision documents more clearly explain how the MNR component of the preferred alternative would ensure protectiveness.

Applicable or Relevant and Appropriate Requirements

The Region's presentation to the Board included definitions for wetland soil versus aquatic sediment that were developed for the Raritan Bay site. The Board believes that the definitions for wetland soil and aquatic sediment are critical components for the preferred alternative (#3), which includes excavations, MNR and on-site disposal. The Board recommends that the Region clarify the site-specific soil and sediment definitions and explain their compatibility with other EPA definitions (e.g., http://water.epa.gov/type/wetlands/types_index.cfm) and other agencies' definitions (e.g., Army Corps of Engineers [COE]Wetlands Delineation Manual and Soil Conservation Service's [SCS] definition for hydric soils), as well as the relationship to MNR, and the State of New Jersey's soil standards.

The Board notes that for certain areas of the Site, the Region may be considering the New Jersey soil remediation standards as a potential ARAR. At the same time, it appears that the Region's preferred alternative would consider the wetlands area as a contaminated sediment site and would use an MNR approach for cleanup. Application of the definitions of wetland soil and aquatic sediment could be important for evaluating alternatives and determining the potential use of ARARs and TBCs at this site. In particular, the Board recommends that the Region describe in more detail how various portions of the Site are saturated, flooded or ponded, as described in the EPA/COE/SCS definitions. In light of existing Agency definitions developed for the wetlands program, the Board recommends that the Region more

clearly explain in its decision documents how it is delineating specific areas of soil and sediment throughout the Site, and whether the state soil standards should be considered more appropriately as potential ARARs or TBCs in various locations.

Furthermore, the package presented to the Board indicates in Table 9 that Executive Order 11988 and OSHA 29 CFR 1910 are applicable standards. The Board notes that, while these are important considerations, they do not represent the kind of promulgated, enforceable and generally applicable (or waiveable) regulations or standards that generally qualify as ARARs. The Region should clarify the list of ARARs consistent with Appendix E of OSWER Directive No. 9355.3-01, October 1988, *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLCA* and contact OSRTI/ARD/SARDB if it needs assistance.

Finally, in the presentation to the Board, the Region indicated that the final arsenic cleanup level of 15 mg/kg was derived from the site-specific background concentration of arsenic. The Region's justification for using background as the remedial goal was founded in a human health risk characterization that utilized conservative assumptions of arsenic chemical form and toxicity. These conservative assumptions, coupled with State regulations and EPA policy, support the use of background as the clean-up goal when risk-based remedial goals are below background. Given that further evaluation of arsenic risk at this site may suggest that human health arsenic risk is lower than the risks presented, the Board notes that the risk-based sediment arsenic remedy goal may increase to a concentration above background. Since it was unclear in the presentation to the Board whether the State actually has a numeric arsenic standard for sediment that constitutes an ARAR, the Board recommends that the Region better explain in its decision documents whether the State standard for arsenic is an ARAR or TBC, and how this could affect the remedy.

Cost

According to the information presented to the Board, the discount rate used for the net present worth cost calculations of remedial alternatives was 5.25 percent. However, the Board notes that, in accordance with current EPA guidance, OSWER Directive 9355.0-75 (July 2000; pages 4-4 and 4-5), a discount rate of 7 percent should generally be used for all non-Federal facility feasibility study present-value analysis. Therefore, the Board recommends that the Region either: (1) use a discount rate of 7 percent for all present worth calculations, or (2) provide an explanation and sensitivity analysis in accordance with the above-noted 2000 EPA guidance. In addition, it is noted in the cost information presented to the Board that an escalation factor of 3.11 percent was also used in the present value cost analysis for all remedial alternatives. The Board recommends that the Region provide further explanation in the decision documents for the use of this escalation factor. Finally, in the cost summary information presented to the Board (page 39 of the package), it appears that non-discounted operation and maintenance costs were used in the calculation of what is referred to as "present worth costs." While the OSWER guidance referenced above recommends the development of a non-discounted scenario (page 4-2), it also states that the non-discounted scenario should be presented for comparison purposes only, and should not be used in place of present value costs in the remedy selection process. The Board recommends that the Region review the present worth analysis for each of the alternatives to ensure that the appropriate values were used in the development of total present worth costs. Future decision

documents should include present worth values calculated using 7 percent and may include present worth values using a different discount rate provided a specific explanation is given.

In the package and presentation to the Board, it was noted that remedial alternatives #3-6 all meet, to varying degrees, the NCP comparative analysis of alternatives criteria. It was also noted that the preferred alternative (#3) was approximately $30M more than alternatives #4 or #5; this additional expense results from the Region's preference to excavate/dredge and dispose offsite all of the contaminated slag, battery casings, and soil and sediment (excluding areas 7, 9, and 11). Further, the Region indicated that the contaminated slag and battery casings mainly constitute the Site's principal threat waste (PTW). The Board commends the Region for PTW removal and disposal-treatment at this site; however, it is unclear why the remaining, lesser-contaminated soil and sediment cannot be adequately contained on-site at a lower overall cost while still ensuring protectiveness of human health, consistent with the NCP's nine criteria for evaluating alternatives. Given this lack of clarity, the Board recommends that the Region more clearly explain in the decision documents its reasons for preferring a more costly remedy over other alternatives that are also protective at this site.

Preliminary Remediation Goals/Cleanup Levels

During the presentation to the Board, the Region indicated that as a result of some recent re-analysis, the unified lead PRG may be established as 400 mg/kg rather than the value of 232 mg/kg, the value presented in the review package. The Board also notes that comments provided on behalf of NL Industries. Inc., by Advanced Geoservices Corporation dated March 12, 2012, raised issues with regard to both the proposed PRGs and the use of the unified PRG approach at this site. The Board recommends that the Region, in its decision documents, better explain the basis for the selection of each of the compound-specific PRGs and its rationale for the use of the unified PRG approach.

The Board notes that the package states that long term-monitoring would include biota sampling; the Board recommends that the Region's decision documents include cleanup levels against which sampling results will be compared.

Conclusion

We commend the Region's collaborative efforts in working with the Board and stakeholder groups at this site. We request that a draft response to these recommendations be included with the draft proposed plan when it is forwarded to the Office of Superfund Remediation and Technology Innovation's Site Assessment and Remedy Decisions (SARD) branch for review. The SARD branch will work with both your staff and the Board to resolve any remaining issues prior to your release of the record of decision. This memo will be posted to the Board's website (http://www.epa.gov/superfund/programs/nrrb) within 30 calendar days of my signature. Once your response is final and made part of the Site's administrative record, your response will also be posted on the Board's website.

Thank you for your support and the support of your managers and staff in preparing for this review. Please call me at (703) 347-0124 should you have any questions.

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